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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,173	04/22/2004	Syotaro Ono	252311US2S	6045

22850 7590 10/26/2006

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EXAMINER

DICKEY, THOMAS L

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 10/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/829,173

Applicant(s)

ONO ET AL.

Examiner

Thomas L. Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 September 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,8-11 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 11 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8,19 and 21 is/are allowed.
- 6) ☒ Claim(s) 1-3,6,10 and 20 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## DETAILED ACTION

1. The amendment filed on 9/15/06 has been entered.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3,6,10 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by LIN ET AL. (6,093,606).

Lin et al. discloses a semiconductor device comprising a first semiconductor (DRAIN) region "S" of a first (n) conductivity type; a second semiconductor (BASE) region "CH" of a second (p) conductivity type formed on the first semiconductor (DRAIN) region "S"; a third semiconductor (SOURCE) region "D" of the first (n) conductivity type formed on a part of the second semiconductor (BASE) region "CH"; the first "S" to third "D" semiconductor regions being formed into a MOS field-effect transistor; a trench 18 formed to range from a surface of the third semiconductor (SOURCE) region "D" to the third semiconductor (SOURCE) region "D" and the second semiconductor (BASE) region "CH", the trench 18 penetrating the third semiconductor (SOURCE) region "D", a

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depth of the trench 18 being shorter than a depth of a deepest bottom portion of the second semiconductor (BASE) region "CH", a gate insulating film 22 formed on both facing side surfaces of the trench 18; first and second gate electrodes FG formed on the gate insulating film 22 and opposed to the facing side surfaces of the trench 18, the first and second gate electrodes FG being separated from each other; the separated first and second gate electrodes FG including, in a cross sectional cut in a depth direction of the trench 18 and including the first and second gate electrodes FG, at least one portion to which the first and second gate electrodes FG are not connected; a first conductive material CG formed between the first and second gate electrodes FG on the side surfaces of the trench 18, an insulating film 30 intervened between the first conductive material CG and the first and second gate electrodes FG; and a fourth semiconductor region 27 of the first (n) conductivity type formed between the bottom surface of the trench 18 and the first semiconductor (DRAIN) region "S", the fourth semiconductor region 27 having an impurity concentration higher than an impurity concentration of the first semiconductor (DRAIN) region "S" and being arranged apart in boundary regions of the first semiconductor (DRAIN) region "S" and the second semiconductor (BASE) region "CH"; wherein a boundary portion between the first semiconductor region and the second semiconductor region and a bottom portion of the trench 18 cross each other and the first conductive material CG is a floating electrode, and a deepest portion of the second semiconductor region has an impurity concentration not higher than an impurity concentration of a channel region of the second semiconductor region formed along side surfaces of a trench 18 on which the first and second gate electrodes FG are formed. Note figures 3,4, and column 5 lines 10-65 of Lin et al.

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***Response to Arguments***

3. Applicant's arguments with respect to claims 1-3,6,10 and 20 have been considered but are moot in view of the new ground(s) of rejection.

***Allowable Subject Matter***

4. Claims 8,19, and 21 are allowed over the references of record because none of these references disclosed or can be combined to yield the claimed invention such as a combination including all the limitations of claim 1 device, as claimed 11/28/05 and rejected as anticipated by Ueno, as well as being anticipated by Takahashi et al., said limitations being combined with the limitations of claims 7 and 8.

5. Claims 4 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

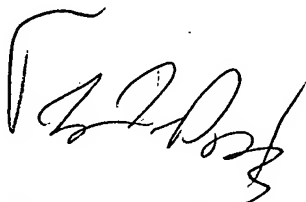
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status

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information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'T. L. Dickey', with a stylized flourish at the end.

**Thomas L. Dickey**  
**Primary Examiner**  
**Art Unit 2826**